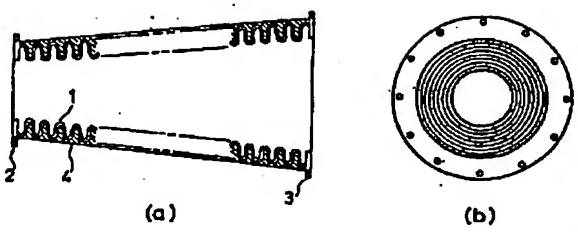
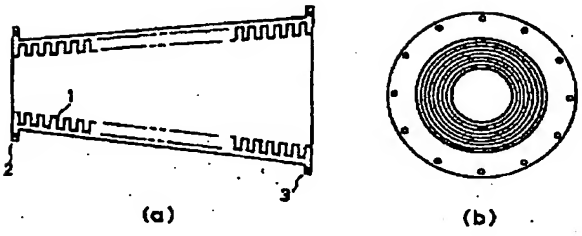


第 1 図



第 2 図

PF020130
US

Japanese Kokai Patent Application No. Sho 60[1985]-236504

Job No.: 228-102548 Ref.: JP 60-236504/PF020130 US/BJC/#6762
Translated from Japanese by the Ralph McElroy Translation Company
910 West Avenue, Austin, Texas 78701 USA

JAPANESE PATENT OFFICE
PATENT JOURNAL (A)
KOKAI PATENT APPLICATION NO. SHO 60[1985]-236504

Int. Cl.[4]:	H 01 Q 13/02 H 01 P 11/00
Sequence Nos. for Office Use:	7741-5J 6749-5J
Filing No.:	Sho 59[1984]-94295
Filing Date:	May 10, 1984
Publication Date:	November 25, 1985
No. of Inventions:	1 (Total of 3 pages)
Examination Request:	Not filed

METHOD FOR MANUFACTURING A CORRUGATED CONICAL HORN FOR AN ANTENNA

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[There are no amendments to this patent.]

Claim

A method for manufacturing a corrugated conical horn for an antenna characterized by the following facts:

the corrugated conical horn for an antenna has circumferential recessed/projecting grooves, with a prescribed width and depth and formed with a prescribed spacing between

adjacent grooves, around the inner wall surface of a conical horn; in the method for manufacturing said corrugated conical horn for an antenna,

a thin metal sheet is plastically molded to form said recessed/projecting grooves,

and a reinforcing material is applied to the metal sheet.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a method for manufacturing a corrugated conical horn as a temporary radiator for relatively large antennas operating in the microwave band or quasi-millimeter wave band.

Prior art

In the prior art, the corrugated conical horn of this type is manufactured as follows. As shown in Figures 2(a), (b), an electroconductive metal is formed using the method for forming cans from metal sheets or using the method of casting to form a conical feed member. Circumferential grooves are then mechanically cut one by one by means of "NC" machining to form said grooves with high precision at a prescribed spacing between adjacent grooves in the inner wall surface.

This prior art machine cutting method requires a lot of processing time, and it is inappropriate for mass production. It is also very expensive. In addition, machine cutting leads to deformation and distortion, so that the feed member has to have a thick wall, leading to increased weight, and thus difficulty in transportation and installation. This is undesirable.

Problems to be solved by the invention

The purpose of the present invention is to provide a method for manufacturing a corrugated conical horn for an antenna characterized by the fact that it has a low cost, a simple operation, and excellent mass productivity.

Means to solve the problems

The present invention provides a method for manufacturing a corrugated conical horn for an antenna characterized by the following facts: the corrugated conical horn for an antenna has circumferential recessed/projecting grooves with a prescribed width and depth formed at a prescribed spacing between adjacent grooves around the inner wall surface of a conical horn; in the method for manufacturing said corrugated conical horn for an antenna, a thin metal sheet is plastically molded to form said recessed/projecting grooves, and a reinforcing material is applied onto the metal sheet.

Operation

In this method, machine processing of the inner surface of the feed member is completely omitted. Instead, the plastic deformation properties of the feed material are used to process a ductile thin metal sheet into a conical or cylindrical shape, and the inner surface of this feed material is processed to have the same shape and dimensions as required for the inner surface of the final product by means of plastic molding, such as applying a split mold tightly to the sheet. The inner surface of the manufactured product can be used as is.

Application examples

In the following, the corrugated conical horn of the present invention will be explained in more detail with reference to application examples illustrated with figures.

Figures 1(a) and (b) are a cross section and front view of an application example of the corrugated conical horn of the present invention. Figure 1(a) is a longitudinal cross section, and Figure 1(b) is a front view as seen from the side of the opening (1) represents the corrugated part; (2) and (3) represent flanges; and (4) represents the reinforcing material of the corrugated part. As shown in Figure 1, the characteristic feature of the present invention is that the recessed/projecting grooves of the corrugated part are integrally molded by plastically forming the thin metal sheet.

In this manufacturing method, for example, plastic molding is performed by tightly fixing a thin ductile metal sheet to a mold (such as a split mold) machined to have recessed/projecting grooves with the same shape and dimensions as those required on the inner surface of the corrugated conical horn. Reinforcing material (4) is then applied. For example, reinforcing material (4) may be a plastic material.

In this plastic formation method, the precision of the product depends on the tightness of contact between the mold and the metal sheet. Also, it depends on the ductility of the feed material and the thickness of the sheet. The better the ductility or the thinner the sheet, the higher the precision of the product obtained. Also, a thinner sheet leads to a lighter weight, thus solving problems relating to transportation and installation. As shown in Figure 1(a), flanges (2), (3) are attached to the product obtained in the aforementioned process, and reinforcing material (4) is applied.

Effects of the invention

As explained above, the method of manufacturing by plastic molding using a thin metal sheet can completely omit the machine processing operation needed in the prior art, and it allows automatic formation in mass production so that inexpensive products can be obtained in a simple

way. Also, deformation and distortion in machine processing necessitated considerable sheet thickness in the prior art. In the present invention using plastic molding, however, a thinner sheet provides better tightness when the mold is applied. As a result, the weight is significantly reduced, and at the same time highly precise products can be mass produced. These are the effects of the present invention. When plural corrugated conical horns of the present invention are joined in the longitudinal direction by their flanges such that the inner diameters of adjacent corrugated conical horns match each other, it is possible to form a primary radiator serving as a large antenna for use in satellite communication and other applications.

Brief description of the figures

Figure 1(a) is a longitudinal cross section illustrating the corrugated conical horn in an application example of the present invention.

Figure 1(b) is a front view of the corrugated conical horn of the present invention as viewed from the side of the opening.

Figure 2(a) is a longitudinal cross section of the corrugated conical horn in the prior art.

Figure 2(b) is a front view of the corrugated conical horn of the prior art as viewed from the side of the opening.

1 Corrugated part
2, 3 Flange
4 Reinforcing material

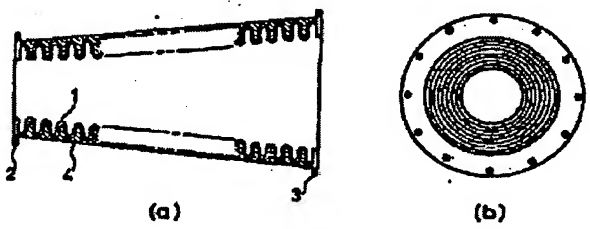

Figure 1

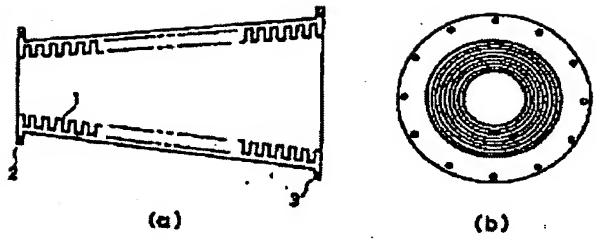

Figure 2